

## REMARKS

Claims 1-31 are currently pending in this application. Claims 1-5, 13, 19, 25 and 29 are currently rejected under 35 U.S.C. 103(a) and claims 6-12, 14-18, 20-24, 26-28, 30 and 31 are currently objected to. Applicants respectfully requests reconsideration of this application in light of the foregoing amendments and following arguments. No new matter has been added.

### 35 U.S.C. 103(a) Claim Rejections

Claims 1-5, 13, 19, 25 and 29 are currently rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,215,317 to Siddiqui et al. in view of U.S. Patent No. 5,136,249 to White et al. Applicants traverses these rejections.

It is respectfully submitted that the invention of claims 1-5, 13, 19, 25 and 29 would not have been obvious to one of ordinary skill in the art over Siddiqui et al. in view of White et al. The Patent Examiner merely points to White et al. as teaching that soil bulk electrical conductivity  $EC_b$  can be determined from a time domain reflectometry signal, and does not cite a reference teaching or suggesting using a predetermined relationship between the apparent dielectric constant  $K_a$  of a soil and the soil's bulk electrical conductivity  $EC_b$  to calculate soil dry density or gravimetric water content. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974); MPEP §2143.03. Siddiqui et al. does not teach or suggest calculating gravimetric water content and/or soil dry density using a predetermined relationship between  $K_a$  and  $EC_b$ , and neither does White et al., alone, or in combination with Siddiqui et al. Without a prior art reference teaching or suggesting the calculation of gravimetric water content and/or soil dry density using a predetermined relationship between  $K_a$  and  $EC_b$ , there can be no *prima facie* case of obviousness. Accordingly, Applicants are of the opinion claims 1-5, 13, 19, 25 and 29 are in immediate condition for allowance and such action is kindly requested.

Newly Added Claims

Claims 32, 35, and 36 have been added to further distinguish aspects of the invention over the prior art cited by the Patent Examiner. Neither the combined teachings of Siddiqui et al. and White et al., nor the prior art as a whole, suggest utilizing a difference, or a ratio of differences, including a function of the determined apparent dielectric constant  $K_a$  of a soil and a function of the determined bulk electrical conductivity  $EC_b$  of the soil to calculate the dry density of the soil or the gravimetric water content of the soil. Accordingly, Applicants are of the opinion claims 32 and 35 are in immediate condition for allowance.

Claims 33-34 and 37-38 have been added to further distinguish aspects of the invention over the prior art cited by the Patent Examiner. One aspect of the invention includes adjusting the measured bulk electrical conductivity  $EC_b$  of a field soil sample to compensate for differences in pore fluid electrical conductivity  $EC_w$  used in determining calibration constants, prior to calculating the field soil sample's dry density or gravimetric water content of the soil. For example, as described on page 15 of the specification, if calibration constants  $c$  and  $d$  were determined with laboratory samples having pore fluid electrical conductivity  $EC_w$  of 0.08 S/m, and the pore fluid electrical conductivity  $EC_w$  of the field sample was between 0.08 and 0.10 S/m, the bulk electrical conductivity  $EC_b$  of the field sample would be adjusted to reflect a pore fluid electrical conductivity  $EC_w$  of 0.08 S/m, as shown in FIG. 10. Neither, the combined teachings of Siddiqui et al. and White et al., nor the prior art as a whole, suggest adjusting the determined bulk electrical conductivity  $EC_b$  of the soil prior to calculating the dry density of the soil or gravimetric water content of the soil. Accordingly, Applicants are of the opinion claims 33-34 and 36-37 are in immediate condition for allowance and such action is kindly requested.

Conclusion

For the reasons stated, Applicants respectfully request withdrawal of the objections and rejections. It is believed that this application is now in condition for immediate allowance, and such action is kindly requested. If, after a review of this Amendment, issues remain which may be resolved by a telephone interview, the Patent Examiner is cordially invited to call the Applicants' undersigned attorney.

Respectfully submitted,



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William F. Bahret, Reg. No. 31,087  
Bahret & Associates  
320 N. Meridian St., Suite 510  
Indianapolis, Indiana 46204  
(317) 423-2300